REMARKS

Claims 28, 29, 35, 37, 38, 40 – 51 and 53 – 58 are pending. Claims 28, 29, 35, 37, 48, 49, 55, and 57 have been amended. Claims 1 - 27, 30 – 34, 36, 39 and 52 were cancelled. No new claims have been added. No new matter has been added by virtue of the amendments, support being found throughout the specification and claims as originally filed.

Support for the amendments to the claims can be found in the specification, in particular at page 7, lines 8 – 14 and lines 19 – 25, page 11, lines 23 – page 12, lines 5, page 17, line 22 – page 18, line 3, page 23, lines 18 – 22, and in Figures 3 and 5.

Any cancellation of the claims should in no way be construed as acquiescence to any of the Examiner's rejections and was done solely to expedite the prosecution of the application. Applicant reserves the right to pursue the claims as originally filed in this or a separate application(s).

Objections

The Examiner has objected to claim 55 because of minor informalities. Applicants have amended claim 55 and respectfully request that the objection be withdrawn.

Applicants submit replacement drawings with this response and respectfully request that the objection be withdrawn.

35 U.S.C. §112, second paragraph

The Examiner has rejected claims 28, 29, 35, 37, 38, 41 – 50 and 52 – 58 under 35 U.S.C. §112, second paragraph, as being indefinite. Applicants respectfully disagree.

The Examiner argues that "(c)laims 28, 29, 48, 49 and 57 recite the limitation "a substantially separate aqueous stream" is unclear as to whether the streams are separate or not." (Office Action, p.2).

Applicants point out page 12, line 6, of the present disclosure that defines "substantially separate aqueous stream":

> As used herein, the term "substantially separate aqueous streams" refers to collimated streams with laminar flow

Accordingly, the claims are definite as written. Applicants respectfully request that the foregoing rejection be withdrawn.

35 U.S.C. §102(e)

Claim 57 has been rejected under 35 U.S.C. 102(e) as being anticipated by Chiu et al. (US 7,470,518; the '518 reference herein). Applicants respectfully traverse the rejection.

The applied reference has a common assignee with the instant application. Applicants submit herein a declaration under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another."

Accordingly, applicants respectfully request that the foregoing rejection be withdrawn.

35 U.S.C. §103(a)

Claims 28, 29, 38, 40, 48, 49, 51, 52, 53 and 56 were rejected under 35 U.S.C. 103(a) as being anticipated by Benavides et al. (US 6,443,179; the '179 reference herein) in view of Crivelli (6,869,273; the '273 reference herein). Applicants respectfully traverse the rejection.

Claims 35 and 58 were rejected under 35 U.S.C. 103(a) as being anticipated by Benavides et al. (US 6,443,179; the '179 reference herein) in view of Crivelli (6,869,273; the '273 reference herein) and further in view of Pfost et al. (5,104,621; the '621 reference herein). Applicants respectfully traverse the rejection.

Claims 41 - 43 were rejected under 35 U.S.C. 103(a) as being anticipated by Benavides et al. (US 6,443,179; the '179 reference herein) in view of Crivelli (6,869,273; the '273 reference herein) and further in view of Bjornson et al. (6,103,199; the '199 reference herein). Applicants respectfully traverse the rejection.

Claims 44, 45, 49 and 50 were rejected under 35 U.S.C. 103(a) as being anticipated by Benavides et al. (US 6,443,179; the '179 reference herein) in view of Crivelli (6,869,273; the '273 reference herein) and further in view of Crandall et al. (6,352,766; the '766 reference herein). Applicants respectfully traverse the rejection.

Claims 46 and 47 were rejected under 35 U.S.C. 103(a) as being anticipated by Benavides et al. (US 6,443,179; the '179 reference herein) in view of Crivelli (6,869,273; the '273 reference herein) and further in view of DiZio et al. (6,455,152; the '152 reference herein). Applicants respectfully traverse the rejection.

Claims 54 and 55 were rejected under 35 U.S.C. 103(a) as being anticipated by Benavides et al. (US 6,443,179; the '179 reference herein) in view of Crivelli (6,869,273; the '273 reference herein) and further in view of Chiu et al. (7,470,518; the '518 reference herein). Applicants respectfully traverse the rejection.

Claims 54 and 55 were rejected under 35 U.S.C. 103(a) as being anticipated by Benavides et al. (US 6,443,179; the '179 reference herein) in view of Crivelli (6,869,273; the '273 reference herein) and further in view of Stanto et al. (7,125,660; the '660 reference herein). Applicants respectfully traverse the rejection.

Because all of the foregoing rejections rely on the '179 reference in combination with other secondary references, and in the interest of more compact prosecution, Applicants will address the rejections under 35 U.S.C. 103(a) together.

The present claims recite a system comprising a macroscale device which is interfaced with a microfluidic device using double-sided tape to form a stable association between the microfluidic device and the macroscale device, wherein the double sided tape comprises a first adhesive surface which associates with the macroscale device and a second adhesive surface which associates with the microfluidic device, wherein the microfluidic device has a plurality of interdigitating microchannels suitable for containing a fluid stream; and at least one sensor chamber containing at least one sensor, and wherein each microchannel comprises an outlet for delivering a substantially separate aqueous stream into the sensor chamber, wherein the outlets of the microchannels intersect with at least one of the sensor chambers, and wherein the microfluic device comprises a scanning

mechanism for selectively exposing a sensor to multiple fluid streams from the plurality of microchannel outlets. (Claim 28). The claims also recite a system comprising a macroscale device which is interfaced with a microfluidic device using transfer tape to form a stable association between the microfluidic device having a plurality of microchannels comprising a fluid stream, and the macroscale device, wherein the transfer tape comprises a backing to which an adhesive surface is separably attached and wherein a bond between the adhesive and the backing is weaker than a bond between the adhesive and the macroscale or microfluidic surface, wherein the microfluidic device has a plurality of interdigitating microchannels suitable for containing a fluid stream, and wherein the microfluidic device has at least one sensor chamber containing at least one sensor, and wherein each microchannel comprises an outlet for delivering a substantially separate aqueous stream into the sensor chamber, and wherein the outlets of the microchannels intersect with at least one of the sensor chambers, and wherein the microfluic device comprises a scanning mechanism for selectively exposing a sensor to multiple fluid streams from the plurality of microchannel outlets. (Claim 29).

The ‘179 reference does not anticipate the invention as claimed. In particular, the ‘179 reference nowhere teaches or suggests a microfluidic device, let alone a system, as claimed, where the system comprises a macroscale device which is interfaced with a microfluidic device wherein **the microfluidic device has a plurality of interdigitating microchannels suitable for containing a fluid stream; and at least one sensor chamber containing at least one sensor, and wherein each microchannel comprises an outlet for delivering a substantially separate aqueous stream into the sensor chamber, wherein the outlets of the microchannels intersect with at least one of the sensor chambers, and wherein the microfluic device comprises a scanning mechanism for selectively exposing a sensor to multiple fluid streams from the plurality of microchannel outlets**.

The Examiner refers to Figure 21 and argues that the ‘179 reference teaches “a macroscale device…which is interfaced with a microfluidic device using double sided tape or transfer tape to form a stable association between the microfluidic device and the macroscale device, wherein the double sided tape comprises a first adhesive surface which associates with the macroscale device and a second adhesive surface which

associates with the microfluidic device, wherein the microfluidic device has a plurality of microchannels suitable for containing a fluid stream, and wherein each microchannel comprises an outlet 'for delivering a substantially separate aqueous stream into the sensor chamber,' and at least one sensor." (Office Action, p. 4 – 5). The Examiner argues further that "regarding "for delivery…sensor chamber,' a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art." (Office Action, p.5).

The '179 reference is directed to architecture for packaging surface micromachined electro-microfluidic devices. The '179 reference teaches an electromicrofluidic package that can be plugged into a fluidic printed wiring board, and that uses electric and fluidic connections (col 4, lines 36 – 50). According to the '179 reference "(t)he larger package consists of a circuit board with embedded fluidic channels and standard fluidic connectors…(and) (t)he embedded channels connect to the smaller package, an Electro-Microfluidic Dual-Inline-Package (EMDIP) that takes fluid to the microfluidic integrated circuit (MIC)." (see, e.g. abstract). The '179 reference teaches fluidic and electrical connections to surface micromachined electro-microfluidic devices, where fluidic connections are made through holes in the EMDIP that coincide with holes extending through the Microfluidic Integrated circuit (MIC) from back to front that connect to surface micromachined channels on the front of the module. (col 7, line 6).

Figure 21 teaches a device that is clearly different from the present invention. Nowhere does Figure 21, or any of the other Figures, show a microfluidic device with a plurality of microchannels suitable for containing a fluid stream, at least one sensor chamber containing at least one sensor, and where each microchannel comprises an outlet for delivering a substantially separate aqueous stream into the sensor chamber, wherein the outlets of the microchannels intersect with at least one of the sensor chambers, and wherein the microfluidic device comprises a scanning mechanism for selectively exposing a sensor to multiple fluid streams from the plurality of microchannel outlets.

Figure 21 shows an "assembly 15 (that) comprises an electro-microfluidic device 100 attached directly to a fluidic printed wiring board (FPWB) 110. An adhesive gasket 26

provides combined mechanical bonding and fluidic coupling between fluidic inlet and outlet ports on the bottom side of device 100 (e.g. ports 101), and fluidic channels 20 and 20' disposed inside of FPWB 110. Assembly 15 can further comprise microcapillary glass tube 120 attached to the backside of FPWB 110 and fluidically coupled to channel 20." (col. 17, line 12).

Nowhere in the '179 reference is there teaching or suggestion that the assembly would be capable of performing the delivery of a substantially separate aqueous stream into the sensor chambers, and wherein the microfluidic device comprises a scanning mechanism for selectively exposing a sensor to multiple fluid streams from the plurality of microchannel outlets, as taught in the present invention.

Nowhere in the description or in any of the figures of the '179 reference is there teaching or suggestion that the microfluidic device, which the Examiner argues is the chip (100), has a plurality of microchannels suitable for containing a fluid stream; and wherein the microfluidic device has at least one sensor chamber containing at least one sensor, and wherein each microchannel comprises an outlet for delivering a substantially separate aqueous stream into the sensor chambers, and wherein the microfluidic device comprises a scanning mechanism for selectively exposing a sensor to multiple fluid streams from the plurality of microchannel outlets, as taught in the present invention.

Accordingly, Applicants request withdrawal of the rejection and allowance of the claims.

As set forth above, nowhere in the '179 reference is there teaching or suggestion of a microfluidic device with a plurality of microchannels suitable for containing a fluid stream, at least one sensor chamber containing at least one sensor, and where each microchannel comprises an outlet for delivering a substantially separate aqueous stream into the sensor chamber, wherein the outlets of the microchannels intersect with at least one of the sensor chambers, and wherein the microfluic device comprises a scanning mechanism for selectively exposing a sensor to multiple fluid streams from the plurality of microchannel outlets, as taught in the present invention.

None of the '199, '766 or '152 references cures the defects of the '179 reference.

The '179 reference provides no teaching or motivation to provide a microfluidic

substrate that comprises a plurality of microchannels where each microchannel comprises an outlet for delivering a substantially separate aqueous stream into a sensor chamber, and wherein the microfluic device comprises a scanning mechanism for selectively exposing a sensor to multiple fluid streams from the plurality of microchannel outlets.

As set forth above, the '179 reference features architecture for packaging surface micromachined electro-microfluidic devices. The '179 reference is directed to a need for a standardized electromicrofluidic package that can be plugged into a standard electrical printed circuit board. (col. 4, line 36 – 40). The '179 reference nowhere teaches or suggests microfluidic devices as presently claimed.

None of the '199, '766 or '152 references, when combined with the '179 reference, teaches a system comprising the microfluidic device as claimed.

Accordingly, Applicants request withdrawal of the rejection and allowance of the claims.

Double Patenting

The Examiner argues that if claims 28 and 29 are found allowable, then claims 48 and 49 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. The Examiner argues that "when two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim." (Office Action, p.9). Applicants respectfully traverse the rejection.

The claims are directed to different embodiments, and are not unnecessarily duplicative.

In the interest of advancing prosecution, should claims 28 and 29 be allowed, applicants would consider amending or canceling any claims that would be duplicates of the allowed claims under 37 CFR 1.75.

CONCLUSION

In light of the above remarks, Applicants respectfully request early consideration and allowance of the subject application.

Should the Examiner wish to discuss any of the amendments and/or remarks made herein, the undersigned attorney would appreciate the opportunity to do so.

The Commissioner is hereby authorized to charge any fees that may be required, or credit any overpayment to Deposit Account No. 04-1105.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

By__/Jonathan M. Sparks, Ph.D./__
Jonathan M. Sparks, Ph.D.
Registration No.: 53,624
EDWARDS ANGELL PALMER & DODGE LLP
P.O. Box 55874
Boston, Massachusetts 02205
(617) 239-0719
Attorneys/Agents For Applicant